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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/943,150	08/30/2001	Daniel P. DeLuca	01-415	8646

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EXAMINER

WILKINS III, HARRY D

ART UNIT

PAPER NUMBER

1742

DATE MAILED: 04/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/943,150

Applicant(s)

DELUCA ET AL.

Examiner

Harry D. Wilkins, III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 24-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 24-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2 March 2002 has been entered.

Claim Rejections - 35 USC § 112

2. Applicant's remarks are found persuasive. The rejection under 35 USC 112 has been withdrawn.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Erickson (US 5,366,695) in view of Kenton (US 4,302,256).

Erickson teaches (see abstract and title) a single crystal nickel-based superalloy that contains 1.8-4.0 wt% Cr, 0.25-2.0 wt% Mo, 3.5-7.5 wt% W, *about* 5.0-7.0 wt% Re, 7.0-10.0 wt% Ta, 5.0-7.0 wt% Al, 1.5-9.0 wt% Co, 0-0.15 wt% Hf, 0-0.5 wt% Nb (columbium), 0.1-1.2 wt% Ti and the balance Ni. Erickson further teaches (see col 2,

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lines 44-56) that the alloy may contain 0-0.04 wt% C, 0-0.01 wt% B, 0-0.01 wt% Zr and 0-0.1 wt% V. This composition overlaps the presently claimed range at 3.0-4.0 wt% Cr, 0.25-2.0 wt% Mo, 3.5-7.5 wt% W, *about* 5.0 wt% Re, 7-10 wt% Ta, 5-7 wt% Al, 1.5-9.0 wt% Co, 0-0.04 wt% C, 0-0.01 wt% B, 0-0.01 wt% Zr, 0-0.15 wt% Hf, 0-0.5 wt% Nb, 0-0.1 wt% V and 0.1-0.7 wt% Ti. Regarding the presence of at least one of Ru, Rh, Pd, Os, Ir and Pt, the present claim recites a range of “up to 10 wt%” which includes zero addition of the element. Erickson teaches (see table 4) that the process includes a step of solutionizing wherein up to 100% of the γ' (i.e.-all the γ') is taken into solution. Thus, the superalloy of Erickson is free from eutectic $\gamma - \gamma'$. The composition taught by Erickson does not contain any other elements, and hence, meets Applicant’s “consisting of” language.

Though Erickson teaches (see col 37, lines 55-58) that the alloy is subjected to HIP (hot isostatic pressing) in order to facilitate “nearly complete pore closure” Erickson does not teach a step of HIPing that is at a pressure similar to that of the present invention. The “nearly complete pore closure” of Erickson does not mean pore-free.

Kenton teaches (see abstract) a method of removing cast defects, such as micropores, in superalloys by subjecting the alloy to an HIP treatment. Kenton teaches (see col 5, lines 58-68) that the HIP treatment occurs at 1800-2350°F at 5-50 ksi. This treatment improves the mechanical properties of the alloy, including (see col 5, line 68 to col 6, line 17) the substantially complete removal of defects such as micropores.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the HIP treatment of Kenton to the alloy of Erickson because the HIP treatment

of Kenton improves the mechanical properties of the alloy by removing casting defects such as pores (see abstract and col 5, line 68 to col 6, line 17). Thus, the alloy of Erickson in view of Kenton is pore-free.

Regarding claim 2, Erickson teaches (see col 11, line 63 to col 12, line 21) that the alloy is treated to produce primary gamma prime particles and also secondary gamma prime particles with an ultra-fine size. Thus, Erickson teaches an alloy with a gamma prime morphology with a bimodal γ' distribution.

Regarding claim 5, Erickson teaches (see title) that the superalloy is a single crystal.

5. Claims 3, 4, 6-11 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Erickson (US 5,366,695) in view of Kenton (US 4,302,256) as applied to claims 1, 2 and 5 above, and further in view of DeLuca et al (US 5,605,584).

As described above, Erickson in view of Kenton teach the eutectic γ - γ' free and pore free super alloy as claimed.

Erickson in view of Kenton do not teach the sizes and volume percent distribution of the γ' precipitates as claimed. However, given the teaching of Erickson (see col 11, line 66 to col 12, line 21), it would have been within the expected skill of a routineer in the art to adjust the γ' aging condition in order to obtain a desirable γ' particle size such as that disclosed by DeLuca et al.

DeLuca et al teach (see abstract) forming a bimodal γ' precipitate distribution in a superalloy. The large particles had (see col. 3, lines 29-45) size of about 5-15 microns

and were preferably present (see claim 6) at about 30-40% by volume. The small cuboidal particles have size of about 0.3-0.7 microns.

Therefore, it would have been obvious to one of have incorporated the bimodal γ' precipitate distribution of DeLuca et al in the alloy of Erickson because the bimodal γ' distribution provides (see abstract) a microstructure that was damage tolerant, thus leading to a longer workpiece lifetime.

Regarding claims 4 and 11, DeLuca et al teach (see col. 3, lines 33-34) that the smaller γ' precipitates are cuboidal in shape. DeLuca et al teach (see col. 3, lines 44-45) that the large γ' precipitates have a branched configuration with three or four branches. The four-branched precipitates are "octet-shaped" precipitates as claimed.

Regarding claims 6, 10 and 24, Erickson teaches (see col 11, line 63 to col 12, line 21) that the alloy is treated to produce primary gamma prime particles and also secondary gamma prime particles with an ultra-fine size. Thus, Erickson teaches an alloy with a gamma prime morphology with a bimodal γ' distribution. Combined with the teachings of DeLuca et al (specifically in the abstract and col. 3, lines 46-50) of restraining crack propagation, one of ordinary skill in the art would have expected the alloy of Erickson in view of Kenton and DeLuca et al to have the ability to resist initiation and subsequent propagation of fatigue cracks in a hydrogen environment as claimed.

Regarding claim 25, see above regarding claims 4 and 24.

Regarding claim 26, see above regarding claims 1 and 24.

Response to Arguments

6. Applicant's arguments filed 2 March 2004 have been fully considered but they are not persuasive. Applicant argued that:

- a. Erickson does not meet the claimed limitation of less than 5.0 wt% Re since Erickson does not define "about".

In response, since Erickson does not give an express definition for "about" it is given its ordinary meaning in the art. That is, the term "about" in Erickson is meant to provide a bit of leeway at the boundary edges of the disclosure. Hence, it is considered that values of Re below 5.0 wt% are within the scope of Erickson, such as 4.999999 wt%. At the very least, one of ordinary skill in the art would have considered the alloy of Erickson (at 5.0 wt% Re) to have the same properties as an alloy that has below 5.0 wt% Re, such as one which contains 4.9999 wt% Re. See MPEP 2144.05.

- b. Kenton does not teach "pore-free", particularly, Kenton teaches "*substantially* pore free".

In response, this argument is not found persuasive. The HIP method of Kenton is substantially similar to the HIP method step disclosed in the specification. If Applicant persists in asserting that the HIP method of Kenton is unable to achieve total removal of pores, the Examiner invites Applicant to submit experimental data showing that the HIP method of Kenton is not capable of achieving total pore removal.

- c. Erickson does not teach the gamma prime solutioning, and hence does not teach that the alloy is eutectic gamma prime free.

In response, the Examiner respectfully disagrees. As can be seen from Table 4 of Erickson, specific heat-treatment conditions are disclosed which produce 100% solutioning of *all* gamma prime phases, which would include both “cooling gamma prime” phases and eutectic gamma prime phases.

d. DeLuca does not necessarily teach an octet shaped gamma prime phase.

In response, Applicant’s arguments are mere speculation since, in Applicant’s own words, “a particle with four branches *could* have more than eight sides” [emphasis added]. In addition, it is unclear to the Examiner the actual shape of Applicant’s claimed “octet” gamma prime phase. The Examiner requests Applicant to specifically point out in the drawings or in a prior art reference, what the actual shape of the octet phase is.

e. The reliance on the theory of inherency that the prior art references teach an alloy with the same resistance to initiation and propagation to fatigue cracks is improper due to a slightly different method being applied.

In response, with respect to the property of fatigue cracks, the alloy composition taught by Erickson overlaps the alloy composition recited in the claims and the method of processing taught by Erickson in view of Kenton and DeLuca is substantially identical, therefore, one of ordinary skill in the art would have expected that the products taught by the references would inherently have the same response to fatigue cracks as claimed. “Where the claimed and prior art products are identical or substantially identical in structure or composition or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established, *In re Best* 195 USPQ 430, 433 (CCPA 1977). ‘When the PTO shows a

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sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing they are not.' In re Spada, 15 USPQ2d 1655, 168 (Fed. Cir. 1990). Therefore, the prima facie case can be rebutted by evidence showing that the prior art products do not necessarily possess the characteristics of the claimed product. In re Best 195 USPQ 430, 433 (CCPA 1977).” See MPEP 2112.01. It is the Examiner’s opinion that the prior art methodology is substantially similar to the present methodology, and hence, it is Applicant’s burden to prove that the prior art does not produce the claimed properties.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-Th 10am-8:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Harry D Wilkins, III
Examiner
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